

**REMARKS**

Claims 4, 6-14 and 19-21 are pending in this application. By this Amendment, 4, 6-8, 12 and 21 are amended and claims 1-3, 5 and 15-18 are cancelled. Support for the amendments can be found, for example, in the instant specification at page 2, lines 25-31. No new matter is added. In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

**Rejections Under 35 U.S.C. §103****A. Claims 1-6, 15-18 and 21**

The Office Action rejects claims 1-6, 15-18 and 21 under 35 U.S.C. §103(a) over GB 2,235,697 A to Wukusick et al ("Wukusick") in view of U.S. Patent No. 5,077,141 to Naik et al. ("Naik"). Claims 1-3, 5 and 15-18 are cancelled, rendering the rejection moot as to those claims. As to the remaining claims, Applicants respectfully traverse the rejection.

Claim 6 recites "[a] nickel alloy composition, substantially as defined by the nominal composition: Cr 4.5 wt%; Al 6 wt%; Co 4 wt%; Ta 6 wt%; Re 4 wt%; Hf 0.15 wt%; C 0.05 wt%; Si 0.1 wt%; B 0.005 wt%; W 2 wt%; La 0.003-0.005 wt%; and Y 0.003-0.005 wt%; the remainder being nickel; wherein the composition is free of Mo, Ti, V and Nb" (emphasis added). Claim 21 recites "[a] nickel alloy composition comprising about 4 to about 8wt% Cr, about 5 to about 6.5wt% Al, about 2 to about 6wt% Co, about 4 to about 8wt% Ta, about 3 to about 5wt% Re, about 0.1 to about 0.5wt% Hf, about 0.04 to about 0.1wt% C, about 0.05 to about 0.3 wt% Si and about 0.003 to about 0.01 wt% B, about 0.003 to about 0.008wt% La and about 0.003 to about 0.008wt% Y, with at least the major part of the balance being nickel; wherein the composition is free of Mo, Ti, V and Nb" (emphasis added). Wukusick and Naik do not teach or suggest such nickel alloy compositions.

The Office Action asserts that Wukusick discloses a nickel alloy including various of the recited components of claims 6 and 21. The Office Action concedes that the alloys of

Wukusick do not include silicon, but asserts that Naik's disclosure of a nickel alloy including silicon remedies this deficiency. Notwithstanding these assertions, Wukusick and Naik do not teach or suggest the compositions of claims 6 and 21.

The alloys of Wukusick do not include silicon or lanthanum. Claim 6 includes silicon in an amount of 0.1 percent by weight and lanthanum in an amount of from 0.003 to 0.005 percent by weight; claim 21 includes silicon in an amount of from about 0.05 to about 0.3 percent by weight lanthanum in an amount of from about 0.003 to about 0.008 percent by weight. As Wukusick does not provide any disclosure with respect to an alloy including silicon and/or lanthanum, as conceded in the Office Action, Wukusick does not teach or suggest the alloy compositions of claims 6 and 21.

Naik discloses a nickel alloy composition including from about 0.2 to 1.0 percent by weight silicon. *See, e.g.*, Naik, abstract. The alloy of Naik may further include from about 0.02 to 1.0 percent by weight lanthanum. *See, e.g., id.* Nowhere does Naik disclose a nickel alloy composition including lanthanum in an amount of from 0.003 to 0.005 percent by weight or from about 0.003 to about 0.008 percent by weight, as recited in claims 6 and 21, respectively. Naik, like Wukusick, does not teach or suggest nickel alloy compositions including lanthanum in an amount of from 0.003 to 0.005 percent by weight or from about 0.003 to about 0.008 percent by weight – thus, the combination of references does not teach or suggest the nickel alloy compositions of claims 6 and 21.

Moreover, claims 6 and 21 explicitly recite that the compositions are "free of Mo, Ti, V and Nb." The nickel alloy compositions of Wukusick include molybdenum in an amount of from 0 to 2 weight percent (most preferably 1.5 weight percent) and titanium in an amount of from 0 to 2 weight percent. *See* Wukusick, page 3, Table I. The nickel alloy compositions of Naik necessarily include either vanadium or niobium. *See*, Naik, column 5, lines 57-61 ("The new and improved properties of the present single crystal superalloy compositions over

related compositions of the prior art result from critical additions of rhenium, vanadium and/or niobium, platinum, yttrium and/or lanthanum."). Both of the references strongly suggest using alloy components that are expressly excluded from claims 6 and 21, and thus one of ordinary skill on the art would not have relied on these references to achieve the inventions of claims 6 and 21. It can never be obvious to remove an element that a prior art reference describes as "critical," as such a description plainly teaches away from such exclusion.

The Office Action includes the statement "... however, as each of the ranges for these elements includes zero, they may be omitted." *See* Office Action, page 4. The fact that an element may be excluded does not constitute teaching or suggestion that the element must be excluded. For example, the Office Action asserts that a suggestion to exclude molybdenum exists in Wukusick's teaching that the disclosed alloy composition can include 0-2 weight percent, preferably 1.3-1.7 weight percent, and most preferably 1.5 weight percent molybdenum. *See* Wukusick, page 3, Table 1. A preference for including molybdenum is not a suggestion that it be excluded, but rather evidence that the reference teaches away from excluding molybdenum.

The mere appearance of overlapping ranges of disparate elements in separate references cannot constitute teaching or suggestion of a claim including each of those disparate elements. This is merely "picking and choosing" elements for which there is no motivation to combine, and constitutes the use of impermissible hindsight. The only motivation to combine the teachings of the various cited references in the manner suggested by the Office Action lies in Applicants' own disclosure. A *prima facie* case of obviousness has not been made.

Moreover, none of the cited references identify the problems of known compositions identified by the present inventors, or obtain the unexpected, superior results described in the

instant specification. The present inventors discovered that the presence of any of molybdenum, vanadium, titanium and niobium in a nickel alloy composition harm the ability of the composition to resist oxidation and corrosion at high temperatures. *See* instant specification, page 2, lines 25-31. The alloy compositions of claims 6 and 21 possess excellent high temperature resistance and a broad front oxidation rate that is significantly less than in known compositions, making the compositions suitable for application to the tips of gas turbine blades. *See id.* page 4, lines 9-14. These compositions permit the manufacture of gas turbine blades with acceptable strength (e.g., tensile and low cycle fatigue strength), creep and high temperature oxidation and corrosion resistance, while being less expensive than known nickel alloy compositions. *See id.*, page 3, line 35 to page 4, line 7. Accordingly, in addition to being neither taught nor suggested by the cited references for the reasons discussed above, the compositions of claims 6 and 21 achieve benefits not possible with known compositions.

Claims 6 and 21 would not have been rendered obvious by Wukusick in view of Naik. Claim 4 depends from claim 21 and, thus, also would not have been rendered obvious by the cited references. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Claim 6

The Office Action rejects claim 6 under 35 U.S.C. §103(a) over Wukusick in view of Naik, and further in view of U.S. Patent No. 5,916,382 to Sato et al. ("Sato") and U.S. Patent No. 4,110,110 to Kondo et al. ("Kondo"). Applicants respectfully traverse the rejection.

Claim 6 is set forth above. For the reasons set forth above, Wukusick and Naik would not have rendered claim 6 obvious. Sato and Kondo do not remedy the deficiencies of Wukusick and Naik.

Sato, like Wukusick and Naik, fails to teach or suggest a nickel alloy composition including lanthanum in an amount of from 0.003 to 0.005 percent by weight. Moreover, the nickel alloy composition of Sato includes up to 5.8 percent by weight of molybdenum and 0.2 to 3 percent by weight of niobium, which are expressly excluded from the nickel alloy composition of claim 6. Accordingly, Sato does not remedy the deficiencies of Wukusick and Naik.

Kondo is cited for its alleged teaching of a nickel alloy composition including lanthanum. The teachings of Kondo would not provide an artisan of ordinary skill with any guidance with respect to the effect of adding lanthanum to a composition, such as recited in claim 6. Kondo recommends including molybdenum in the disclosed alloy composition. *See* Kondo, column 3, lines 10-13. As discussed above, molybdenum is expressly excluded from the scope of claim 6. In the first of the two actual disclosures in Kondo regarding the use of lanthanum, lanthanum is present in an amount other than the amount in claim 6 (0.02 percent by weight) and the composition further includes 5.0 percent by weight molybdenum, which is expressly excluded from the composition of claim 6. *See id.*, Table 1. In the other example, lanthanum is also present in an amount other than the amount in claim 6 (0.001 percent by weight), and various other components (e.g., chromium, aluminum, etc.) are present in amounts other than the amounts recited in claim 6. *See* Kondo, Table 4.

To form a combination of Wukusick, Naik and Kondo, one would have to ignore virtually the entirety of Kondo's teachings with respect to the composition of an alloy, except for the amount of rare earth metal that should be employed (note that Kondo never explicitly teaches that lanthanum should be used in the amount recited in claim 6). The only rationale for such selective use is provided by Applicants' own disclosure – impermissible hindsight.

For the foregoing reasons, Sato and Kondo do not remedy the deficiencies of Wukusick and Naik. A *prima facie* case of obviousness has not been made.

Claim 6 would not have been rendered obvious by Wukusick in view of Naik, Sato and Kondo. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Claims 7, 11-14 and 20

The Office Action rejects claims 7, 11-14 and 20 under 35 U.S.C. §103(a) over Wukusick in view of Naik, and further in view of U.S. Patent No. 5,622,638 to Schell et al. ("Schell") and Applicants' admission of prior art ("AAPA"). Applicants respectfully traverse the rejection.

Claim 21 is set forth above. For the reasons set forth above, Wukusick and Naik would not have rendered claim 21 obvious. Schell and AAPA do not remedy the deficiencies of Wukusick and Naik.

Schell, like Wukusick and Naik, fails to teach or suggest a nickel alloy composition including lanthanum in an amount of from 0.003 to about 0.008 percent by weight, as recited in claim 21. AAPA, likewise, fails to teach or suggest a nickel alloy composition including lanthanum in an amount of from 0.003 to about 0.008 percent by weight. Accordingly, Schell and AAPA do not remedy the deficiencies of Wukusick and Naik. A *prima facie* case of obviousness has not been made.

Claim 21 would not have been rendered obvious by Wukusick in view of Naik, Schell and AAPA. Claims 7, 11-14 and 20 depend from claim 21 and, thus, also would not have been rendered obvious by the cited references. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

D. Claims 8-10 and 19

The Office Action rejects claims 8-10 and 19 under 35 U.S.C. §103(a) over Wukusick in view of Naik, and further in view of U.S. Patent No. 6,468,367 to Mukira et al. ("Mukira"). Applicants respectfully traverse the rejection.

Claim 21 is set forth above. For the reasons set forth above, Wukusick and Naik would not have rendered claim 21 obvious. Mukira does not remedy the deficiencies of Wukusick and Naik.

Mukira, like Wukusick and Naik, fails to teach or suggest a nickel alloy composition including lanthanum in an amount of from 0.003 to 0.008 percent by weight, as recited in claim 21. Accordingly, Mukira does not remedy the deficiencies of Wukusick and Naik. A *prima facie* case of obviousness has not been made.

Claim 21 would not have been rendered obvious by Wukusick in view of Naik and Mukira. Claims 8-10 and 19 depend from claim 21 and, thus, also would not have been rendered obvious by the cited references. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 4, 6-14 and 19-21 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Date: December 15, 2004

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